

WHAT IS CLAIMED IS:

1. A high-g shock-producing device for testing a sample specimen comprising:

a beam of predetermined length having at least one end substantially rigidly fixed with the specimen mounted thereon at a position remote from the one
5 end; and

a shock column positioned to apply a force causing said beam to bend in a direction transverse to the length, said column configured to have a buckling failure when exposed to a pressure which is sufficient to bend said beam an amount to provide the desired high-g force to the specimen, the buckling failure causing the
10 force to be suddenly removed from said beam so as to release said beam and produce the high-g shock on the specimen.

2. A high-g shock-producing device according to Claim 1 wherein said column comprises:

a top cap;

a bottom cap; and
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a column portion extending between said top cap and said bottom cap, said column portion comprising a feature to induce a buckling failure in said column at a specific pressure.

3. A high-g shock-producing device according to Claim 2 wherein said top cap, said bottom cap, and said column portion comprise threaded end portions, said top cap and said bottom cap threading onto threaded portion of said
20 column portion.

4. A high-g shock-producing device according to Claim 2 wherein said top cap and said bottom cap comprise deformable ridges within a recess therein,

said deformable ridges utilized in press fitting said top cap and said bottom cap to said column portion.

5 5. A high-g shock-producing device according to Claim 2 wherein said column portion comprises a notch formed near a center of the length of said column portion, said notch sized to provide a buckling feature at a specific pressure.

 6. A high-g shock-producing device according to Claim 2 wherein said column portion comprises a reduced cross-section formed near a center of the length of said column portion, said reduced cross-section sized to provide a buckling feature at a specific pressure.

10 7. A high-g shock-producing device according to Claim 2 wherein said column portion comprises:

 end portions; and

 an enlarged cross-section extending between said end portions, said end portions and said enlarged cross-section forming notches where said end portions extend into said top cap and said bottom cap, said enlarged cross-section sized to provide a buckling feature at a specific pressure.

 8. A high-g shock-producing device according to Claim 2 wherein said column portion comprises a ceramic material.

20 9. A high-g shock-producing device according to Claim 2 wherein said beam comprises at least one of aluminum and titanium.

 10. A high-g shock-producing device according to Claim 2 wherein said beam comprises an I-beam configuration.

 11. A high-g shock-producing device according to Claim 2 wherein said top cap and said bottom cap comprise a metal.

25 12. A method of suddenly releasing a beam of a high-g force testing apparatus comprising:

configuring a shock column with a buckling failure point, the buckling failure point being at a pressure;

inserting the shock column between a beam rigidly mounted at least at one end and a pressure producing device; and

5 applying a pressure to the shock column to bend the beam to a desired point, the pressure needed to bend the beam to the desired point being equal to the buckling failure point pressure of the shock column.

10 13. A method according to Claim 12 wherein configuring a shock column with a buckling failure point comprises configuring the shock column with a notch formed near a center of the length of the shock column, the notch sized to provide the buckling failure at a pressure equal to the pressure needed to bend the beam to the desired point.

15 14. A method according to Claim 12 wherein configuring a shock column with a buckling failure point comprises configuring the shock column with a reduced cross-section formed near a center of the length of the shock column, the reduced cross-section sized to provide the buckling failure at a pressure equal to the pressure needed to bend the beam to the desired point.

20 15. A method according to Claim 12 wherein configuring a shock column with a buckling failure point comprises configuring the shock column with an enlarged cross-section extending between end portions of the shock column, the end portions and enlarged cross-section forming notches where the end portions extend into a top cap and a bottom cap, said enlarged cross-section sized to provide the buckling failure at a pressure equal to the pressure needed to bend the beam to the desired point.

25 16. A shock column for a high-g tester comprising:

 a top cap;

 a bottom cap; and

a column portion extending between said top cap and said bottom cap, said column portion configured to buckle when a specific pressure is applied between said top cap and said bottom cap.

17. A shock column according to Claim 16 wherein said column portion comprises a notch formed near a center of the length of said column portion, said notch sized to cause said column portion to buckle at a specific pressure.

18. A shock column according to Claim 16 wherein said column portion comprises a reduced cross-section formed near a center of the length of said column portion, said reduced cross-section sized to cause said column portion to buckle at a specific pressure.

19. A shock column according to Claim 16 wherein said column portion comprises:

end portions; and

an enlarged cross-section extending between said end portions, said end portions and said enlarged cross-section forming notches where said end portions extend into said top cap and said bottom cap, said enlarged cross-section sized to cause said column portion to buckle at a specific pressure.

20. A shock column according to Claim 16 wherein said top cap, said bottom cap, and said column portion comprise threaded end portions, said top cap and said bottom cap threading onto said threaded portion of said column portion.

21. A shock column according to Claim 16 wherein said top cap and said bottom cap comprise deformable ridges within a recess therein, said deformable ridges utilized in press fitting said top cap and said bottom cap to said column portion.

22. A high-g shock producing device for testing a specimen comprising:

a beam having a first end and a second end, and capable of flexing without permanent deformation, rigidly mounted at said first end and said second end;

a fastener for mounting the specimen atop said beam proximate the center thereof;

5 a shock column comprising a top cap, a bottom cap, and a column portion extending therebetween, and positioned such that said top cap bears against said beam, said column portion comprising a feature which causes said column portion to buckle at a specified pressure; and

10 a hydraulic ram positioned to produce an upwardly directed force on said bottom cap of said column to cause said beam to bend to a position where the pressure is sufficient to cause said column portion to buckle, the buckling causing removal of the upwardly directed force thereby allowing said beam to suddenly unbend and apply a g force to the specimen.

15 23. A high-g shock producing device according to Claim 23 wherein said top cap bears against an approximate center of said beam.

24. A high-g shock producing device according to Claim 23 wherein said beam comprises an I- beam.